# Original Article

## Validation of the Modified Pulmonary Functional Status and Dyspnea Questionnaire and the Medical Research Council scale for use in Brazilian patients with chronic obstructive pulmonary disease*

### Validação do *Modified Pulmonary Functional Status and Dyspnea Questionnaire* e da escala do *Medical Research Council* para o uso em pacientes com doença pulmonar obstrutiva crônica no Brasil

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## Abstract

**Objective:** To determine the validity and reproducibility of two subjective instruments to assess limitations in activities of daily living (ADLs) in patients with chronic obstructive pulmonary disease (COPD) in Brazil: the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version (PFSDQ-M) and the Medical Research Council (MRC) scale. **Methods:** Thirty patients with COPD (age, 67 ± 10 years; males, 17; forced expiratory volume in one second, 42% ± 13% of predicted) completed the Portuguese-language versions of the two instruments on two occasions, one week apart. The PFSDQ-M has three components: influence of dyspnea on ADLs, influence of fatigue on ADLs and change experienced by the patient with ADLs. The MRC scale is simple, with only five items, in which patients report the degree to which dyspnea limits their performance of ADLs. The traditional Saint George's Respiratory Questionnaire (SGRQ), previously validated for use in Brazil, was used as a validation criterion. **Results:** The test-retest reliability (intraclass correlation coefficient) of the PFSDQ-M was 0.93, 0.92 and 0.90 for the dyspnea, fatigue and change components, respectively, compared with 0.83 for the MRC scale. Bland-Altman plots showed good test-retest concordance for the PFSDQ-M. The components of the PFSDQ-M and the MRC scale correlated significantly with all of the domains and the total score on the SGRQ ($0.49 < r < 0.80$; $p < 0.01$ for all). **Conclusions:** The Portuguese-language versions of the PFSDQ-M and the MRC scale proved reproducible and valid for use in patients with COPD in Brazil.

**Keywords:** Pulmonary disease, chronic obstructive; Activities of daily living; Validation studies.

## Resumo

**Objetivo:** Verificar a validade e a reprodutibilidade do uso de dois instrumentos subjetivos para avaliar a limitação nas atividades da vida diária (AVD) em pacientes com doença pulmonar obstrutiva crônica (DPOC) no Brasil: o *Pulmonary Functional Status and Dyspnea Questionnaire - Modified version* (PFSDQ-M) e a escala do *Medical Research Council* (MRC). **Métodos:** Trinta pacientes com DPOC (17 homens; idade, 67 ± 10 anos; volume expiratório forçado no primeiro segundo, 42% ± 13% do predito) responderam por duas vezes às versões em português dos dois instrumentos com intervalo de uma semana. O PFSDQ-M contém três componentes: influência da dispnéia nas AVD, influência da fadiga nas AVD, e mudança nas AVD em comparação ao período anterior à doença. A escala do MRC é simples, com apenas cinco itens, dentre os quais o paciente escolhe qual o seu nível de limitação nas AVD devido à dispnéia. O tradicional questionário *Saint George's Respiratory Questionnaire* (SGRQ), já validado para o uso no Brasil, foi utilizado como critério de validação. **Resultados:** A confiabilidade em reteste do PFSDQ-M utilizando o coeficiente de correlação intraclasse foi de 0,93, 0,92 e 0,90 para os componentes dispnéia, fadiga e mudança, respectivamente, enquanto que esta foi de 0,83 para a escala do MRC. A análise dos gráficos de Bland e Altman mostrou boa concordância entre a aplicação e a reaplicação do PFSDQ-M. Os componentes do PFSDQ-M e a escala do MRC se correlacionaram significativamente com os domínios e o escore total do SGRQ ($0,49 < r < 0,80$; $p < 0,01$ para todos). **Conclusões:** As versões em língua portuguesa do PFSDQ-M e da escala do MRC demonstraram ser reprodutíveis e válidas para o uso em pacientes com DPOC no Brasil.

**Descritores:** Doença pulmonar obstrutiva crônica; Atividades cotidianas; Estudos de validação.

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## Introduction

Chronic obstructive pulmonary disease (COPD) is characterized by airflow obstruction that is not fully reversible, with consequent airflow limitation and dyspnea.[1] In addition, COPD has recently been described as a disease with systemic consequences such as progressive loss of physical conditioning and muscle strength.[2] It has been suggested that the interaction among dyspnea, physical deconditioning and muscle weakness results in a sort of vicious cycle or negative spiral,[3] which generates significant functional limitations in patients with COPD.[4] In practice, these functional limitations can be defined as reduced performance of activities of daily living (ADLs).[5] The direct relationship among daily physical activity, morbidity and mortality in patients with COPD[6-8] demonstrates the importance of appropriate assessment of the limitations in performing ADL. The simplest and most widely used method to assess ADL limitations is the administration of specific questionnaires designed to do so.[9]

The international scientific literature offers several questionnaires specifically developed for the assessment of ADL limitations in patients with COPD. Chief among such questionnaires is the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version (PFSDQ-M). In addition, with the objective of assessing the ADL limitations imposed by dyspnea, the Medical Research Council (MRC) scale is an instrument that is traditionally used in the international literature, principally because it is easy to apply and understand. The original English versions of these two instruments have been validated and previously used in scientific studies.[10,11] However, these instruments have yet to be translated into Portuguese. Due to the influence of cultural factors and of subjective interpretation, it is recommended that special attention be given to the validation of questionnaires in a language other than the original, with the aim of maintaining the original meaning of the questions.[12] Therefore, there is a need for appropriate validation before Portuguese-language versions of the PFSDQ-M and the MRC scale can be employed. The development and validation of Portuguese-language versions of these instruments will make them available for use by Brazilian researchers and clinicians. This will increase knowledge regarding the point of view held by Brazilian patients with COPD in relation to their own ADL limitations.

The principal objective of the present study was to investigate the criterion validity, internal consistency and reproducibility of Portuguese-language versions of the PFSDQ-M and of the MRC scale in patients with COPD, using the previously validated Portuguese-language version of the Saint George's Respiratory Questionnaire (SGRQ)[13] as the validation criterion. We put forth the hypothesis that both translated instruments would present good reproducibility and internal consistency, as do the original, English-language versions of the instruments. The hypothesis that the scores of the different domains and the overall score of the SGRQ would correlate with the MRC scale values and the three components of the PFSDQ-M was also tested. In addition, we adopted the hypothesis that the physical activity domain of the SGRQ would better correlate with the PFSDQ-M change in ADLs component than with the MRC scale, since the latter is considered an instrument that grades symptoms related to the ADL performance, and not only to the ADL limitation per se.

## Methods

Thirty patients with COPD completed the Portuguese-language versions of the PFSDQ-M and of the MRC scale on two occasions, one week apart. The SGRQ,[14] already validated in Portuguese,[13,15] was used as the validation criterion with the aim of assessing general aspects of the quality of life of patients with chronic lung disease. On the day of the first administration of the questionnaires, patients were submitted to spirometry and to the six-minute walk test (6MWT) in order to characterize the population and to study the correlations between the two instruments and these tests.

Patients were recruited during their initial assessment prior to enrollment in a pulmonary rehabilitation program at the *Hospital Universitário Regional Norte do Paraná* (HURNPR, Northern Paraná University Hospital), located in the city of Londrina, Brazil. The characteristics of the sample are described in Table 1. The diagnosis of COPD was made according to internationally accepted criteria established by the Global Initiative for Chronic Obstructive Lung Disease.[1] The size of the sample was defined based on the validation studies of the

**Table 1 -** Characterization of the sample of 30 patients with chronic obstructive pulmonary disease.

| Variable | Results |
|---|---|
| Age, years | 67 ± 10[a] |
| Gender, M/F | 17/13 |
| BMI, kg/m$^2$ | 24 ± 5[a] |
| Literate, Yes/No | 19/11 |
| FEV1, % of predicted | 42 ± 13[a] |
| FVC, % of predicted | 65 ± 20[a] |
| FEV1/FVC | 48 ± 12[a] |
| GOLD criteria, I/II/III/IV | 1/5/20/4 |
| Distance covered on the 6MWT, m | 447 ± 119[a] |
| Distance covered on the 6MWT, % of predicted | 74 ± 21[a] |

BMI: body mass index; FEV1: forced expiratory volume in one second; FVC: forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease; and 6MWT: six-minute walk test.; and [a]Results expressed as mean ± SD.

Portuguese-language version of the SGRQ.[13,15] In addition to the diagnosis of COPD, the following inclusion criteria were used: stable condition, free of exacerbations or infections within the last three months; absence of severe or unstable heart disease; and absence of other pathological conditions that could influence ADL performance (for example, cerebrovascular, orthopedic or rheumatic disease). Exclusion criteria were as follows: occurrence of acute exacerbation during the assessment period; and lack of understanding or of cooperation regarding the questionnaires and other assessment methods, according with the subjective judgment of the interviewer who applied the instruments and tests. The study was approved by the Ethics in Research Committee of the Londrina State University HURNPR, and the data were collected from February to September of 2007. In order to participate in the study, all patients gave written informed consent prior to their inclusion.

## Modified version of the Pulmonary Functional Status and Dyspnea Questionnaire

The PFSDQ-M comprises three domains: influence of dyspnea on ADLs, influence of fatigue on ADLs (5 general items and 10 specific items for each domain) and change experienced by the patient in ADLs (10 specific items).[10] The patient reports to what degree dyspnea and fatigue affect 10 specific ADL items, assigning a score from 0 to 10 for each activity as follows: 0 (no interference); 1-3 (mild); 4-6 (moderate); 7-9 (severe); and 10 (extremely severe). In the third domain, the patient quantifies the change in ADLs, assigning a score from 0 to 10 for each activity as follows: 0 (as active as always in relation to this activity); 1-3 (slight change); 4-6 (moderate change); 7-9 (extreme change); and 10 (no longer performs that activity). A partial score, ranging from 0 to 100, is calculated for each of the three domains (dyspnea, fatigue and change in ADLs), and an overall score is obtained by totaling the scores of the three domains, the overall score therefore ranging from 0 to 300. Higher values on the scale indicate greater ADL limitation. The five general questions in the dyspnea and fatigue domains are informative and qualitative, and the answers are not calculated in the questionnaire score (Appendix 1).

## Medical Research Council Scale

The MRC scale comprises only five items, and the patient chooses the item that corresponds to the degree to which dyspnea limits their ADL performance.[11] As can be seen in Appendix 2, patients report the subjective degree of dyspnea by choosing a value from 1 to 5: 1 (experiencing shortness of breath only during vigorous exercise); 2 (experiencing shortness of breath when walking briskly or ascending a gentle slope); 3 (walking slower than other people their age due to shortness of breath or having to stop in order to catch their breath even when walking slowly); 4 (stopping in order to catch their breath after walking less than 100 m or after a few minutes); and 5 (experiencing so much shortness of breath that they no longer leave the home, or experiencing shortness of breath when getting dressed).

Due to the high proportion of illiterate individuals observed in the sample (Table 1), as is typically observed in the underprivileged population served by the HURNPR, part of the standard procedure in the administration of the PFSDQ-M and the MRC scale was reading the questions to all patients. The interviewer read the questions aloud and wrote down the answers given by the patient. The same interviewer applied the questionnaires on both occasions (application and reapplication). On both occasions, the time required for each patient to complete the questionnaires was noted.

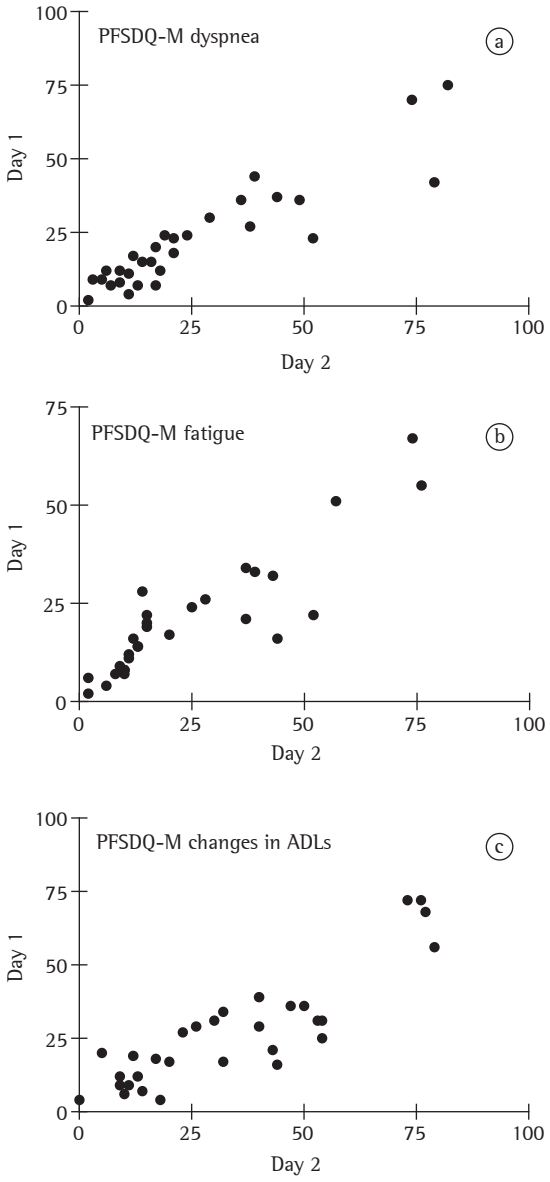


**Figure 1 -** Scattergrams comparing the first application (test, day 1) and the second application (retest, day 2) in relation to domains of the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version (PFSDQ-M). In A, dyspnea; in B, fatigue; and in C, change in activities of daily living (ADLs). The intraclass correlation coefficients for the domains were as follows: dyspnea, 0.93; fatigue, 0.92; and change in ADL, 0.90. No graphic was created comparing the application and reapplication in relation to the Medical Research Council (MRC) scale, due to the characteristic of the scale, which has only five items and therefore generates frequent score overlapping, making it incomprehensible. The intraclass correlation coefficient for the MRC scale was 0.83.

### *Translation process*

The validation of the instruments was performed using the steps proposed in a previous study.[12] First, the authors translated the original English versions of the PFSDQ-M and of the MRC scale into the Portuguese language. The authors then administered this first version in a small sample of five patients with COPD, after which they discussed the difficulties encountered. Since there were no terms and situations in either of the two questionnaires that could not be applied to Brazilians, it was not necessary to perform a cultural adaptation. Subsequently, back-translation into English was carried out by a physical therapist who was educated in English but who had no previous contact with the instruments and was not involved with the present study. These back-translated versions were then sent to the authors of the original versions. After discussing and approving these versions, the authors of the present study finalized the Portuguese language version (Appendices 1 and 2).

## Portuguese-language version of the Saint George's Respiratory Questionnaire

The SGRQ was specifically developed for patients with COPD and covers aspects of quality of life related to three domains: symptoms; activity; and psychosocial impacts of the respiratory disease on the patient. Each domain has a minimum score (0) and a maximum score (662.5; 1,209.1; and 2,117.8, respectively). The points of each answer are added, and the total is referred to as the percentage achieved by the patient in relation to this maximum score.[13-15] An overall score is also calculated based on the results of the three domains, with a maximum of 3,989.4 points. The overall score is also referred to as the percentage achieved by the patient in relation to this maximum score.

The first Portuguese-language version of the SGRQ[13] was faithful to the original version in British English[14] and maintained the characteristic of double negative of questions and answers, with "yes" and "no" as answer options. The version used in the present study was that modified by one group of authors.[15] This new version has "agree" and "do not agree" as answer options in order to avoid double negative constructions and facilitate understanding the questions. In addition, in this new version, the assessment time between the

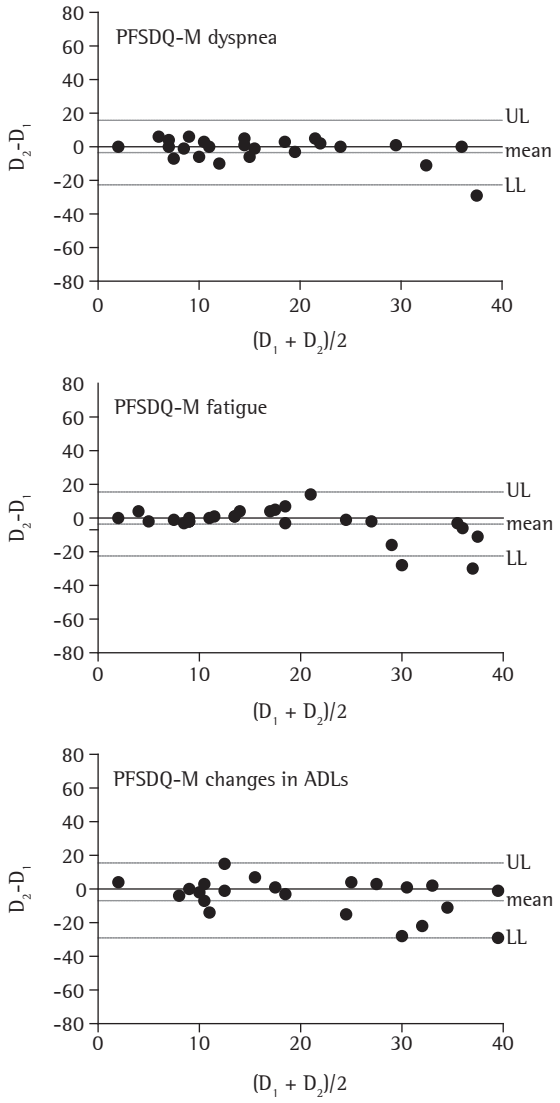


**Figure 2 -** Bland and Altman plots comparing the results of the dyspnea, fatigue and change in activities of daily living (ADL) domains of the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version (PFSDQ-M) during the application ($D_1$) and the reapplication ($D_2$), with indication on the average line, upper limit (UL) and lower limit (LL). The same type of plot in relation to the Medical Research Council scale was not carried out due to the characteristic of the scale, which has only five items and, therefore, generates frequent score overlapping, making it incomprehensible.

applications of the questionnaire was reduced from 12 months to 3 months, in order to make it more appropriate for assessing results of interventions that bring short term benefits.

### *Additional assessments*

Simple spirometry was performed in accordance with the norms of the "Pulmonary Function Test Guidelines".[16] The device used was the Pony Graphic (Cosmed, Rome, Italy), and the values of normality used were those established in a previous study.[17]

The 6MWT was carried out in accordance with international standards,[18] on a 30- meter long corridor. Two tests were performed at least 30 min apart, and the greatest value was used in the analysis. The values of normality used were those established in a previous study.[19] The 6MWT was included in the present study because this test has recently been described as the best clinical predictive test of the degree of daily physical activity for patients with COPD.[4]

### *Statistical analysis*

GraphPad Prism® 3.0 (GraphPad Software Inc., San Diego, CA, USA) was the statistical software used in the statistical analysis. Nonparametric statistical analysis was used because the data were ordinal. The intraclass correlation coefficient (ICC) was used to determine the reproducibility of the application and reapplication of the PFSDQ-M and of the MRC scale. Bland and Altman plots were used in order to visually assess the concordance between the first application (designated day 1) and the second application (designated day 2). The internal consistency of the instruments was assessed using Cronbach's alpha coefficient. Validity of the two instruments in relation to the SGRQ, spirometry variables and the distance covered on the 6MWT were assessed using Spearman's correlation coefficient.

## Results

The group of patients included in the present study was characterized by moderate/severe obstruction, as well as by slightly impaired functional exercise tolerance (Table 1). Of the 30 patients, 19 (63%) were literate and 11 (37%) were illiterate. Mean completion time of the PFSDQ-M on days 1 and 2 was 17 ± 7 min and 1.6 ± 0.7 min, respectively, and mean completion time of the MRC scale on days 1 and 2 was 13 ± 5 min and 1.0 ± 0.4 min, respectively. There was no difference between literate and illiterate patients regarding application time

**Table 2 -** Statistically significant Spearman's correlation coefficients found between the various domains of the Saint George's Respiratory Questionnaire and the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version, as well as the Medical Research Council scale.

| SGRQ | Component/scale to be validated | r | p |
|---|---|---|---|
| Symptoms | PFSDQ-M dyspnea domain | 0.53 | 0.003 |
| | PFSDQ-M fatigue domain | 0.50 | 0.006 |
| | PFSDQ-M change in ADL domain | 0.60 | 0.0004 |
| | MRC scale | 0.49 | 0.006 |
| Physical activity | PFSDQ-M dyspnea domain | 0.70 | 0.0001 |
| | PFSDQ-M fatigue domain | 0.62 | 0.003 |
| | PFSDQ-M change in ADL domain | 0.76 | 0.0001 |
| | MRC scale | 0.56 | 0.002 |
| Impact | PFSDQ-M dyspnea domain | 0.54 | 0.002 |
| | PFSDQ-M fatigue domain | 0.53 | 0.003 |
| | PFSDQ-M change in ADL domain | 0.66 | 0.0001 |
| | MRC scale | 0.55 | 0.002 |
| Total | PFSDQ-M dyspnea domain | 0.70 | 0.0001 |
| | PFSDQ-M fatigue domain | 0.66 | 0.0001 |
| | PFSDQ-M change in ADL domain | 0.80 | 0.0001 |
| | MRC scale | 0.65 | 0.0001 |

SGRQ: Saint George's Respiratory Questionnaire; PFSDQ-M: Pulmonary Functional Status and Dyspnea Questionnaire - Modified version; MRC: Medical Research Council; and ADL: activity of daily living.

or the score on either instrument, since the same administration method was used for all patients (the questions were read by an interviewer).

For the different domains of the PFSDQ-M, the ICC between the two applications was as follows: dyspnea, 0.93; fatigue, 0.92; and change in ADL, 0.90. The corresponding ICC for the MRC scale was 0.83 (Figure 1). The analysis of the Bland and Altman plots showed good concordance between the first and second application of the questionnaires (Figure 2). The Cronbach's alpha coefficient for the PFSDQ-M was 0.94. It was not possible to calculate the Cronbach's alpha coefficient for the MRC scale due to the characteristics of the scale.

The MRC scale and the domains of the PFSDQ-M correlated significantly with all of the domains and the overall score of the SGRQ ($0.49 < r < 0.80$). The SGRQ correlated better with the change in ADL domain of the PFSDQ-M than with the MRC scale ($r = 0.76$ and $r = 0.56$, respectively; $p < 0.05$ for both). As shown in Table 2, the MRC scale correlated in a relatively similar manner with the physical activity and symptoms domains of the SGRQ ($r = 0.56$ and $r = 0.49$, respectively; $p < 0.05$ for both).

The MRC scale tended to correlate with the distance covered on the 6MWT ($r = -0.31$; $p = 0.08$). There was no significant correlation between any domain of the PFSDQ-M and the distance covered on the 6MWT ($p > 0.15$ for all). In addition, neither the PFSDQ-M nor the MRC scale correlated with any of the spirometric variables ($p > 0.40$ for all).

## Discussion

The present study showed that the Portuguese-language version of the PFSDQ-M is reproducible, has internal consistency and presents external validity when compared to a traditional and previously validated instrument. This is due to the high ICC values, good concordance in Bland and Altman plots, high Cronbach's alpha coefficient and good correlation with different domains and with the overall score of the SGRQ. The PFSDQ-M has already been validated in Swedish and in Japanese.[20,21] The Japanese-language version presented ICC values and Cronbach's alpha coefficients similar to those found in the present study.[21] The Portuguese-language version of the MRC scale also proved reproducible and valid. In a review of the international literature, we found no formal validation of the MRC scale in a language different from that of the original (English), although it has been used in various studies in different languages without description of the validation process.

All items included in both of the original instruments are applicable to any patient with COPD from any country or speaking any language. This is due to the fact that the 10 activities included in the PFSDQ-M correspond to those in which the great majority of patients with COPD frequently complain of experiencing great limitations in their everyday life. In addition, the five items of the MRC scale describe different degrees of sensation of dyspnea. No item in the present versions of the instruments (Appendices 1 and 2) presents any discordance with the Portuguese language or with the Brazilian cultural and social scenario, and therefore there was no need for any significant adaptations.

The SGRQ was chosen as the validation criterion for the Portuguese-language versions of the PFSDQ-M and of the MRC scale because it was used as the validation criterion of the original English version of the MRC scale,[11] as well as because it is considered an instrument with proven validity and is widely used in scientific research.[3-15,22-24]

In general, the MRC scale and the domains of the PFSDQ-M correlated significantly with all of the domains and with the overall score of the SGRQ, demonstrating that the translated versions of these two instruments are valid (Table 2). However, the overall score of the SGRQ is characterized as a general assessment of health-related quality of life of patients with chronic lung disease, and it is not an instrument that specifically determines ADL limitation. The physical activity domain of the SGRQ, however, is more directly related to the physical limitation presented by these patients. The results presented in Table 2 confirm the hypothesis that this domain correlates better with the change in ADL domain of the PFSDQ-M than with the MRC scale, which is considered an instrument that grades symptoms related to ADL performance and not only to the ADL limitation itself. This supposition regarding the MRC scale can be corroborated by the fact that, in the present study, this scale correlated in a relatively similar manner with the physical activity and symptoms domains of the SGRQ.

A study carried out in Spain showed that maximum exercise tolerance correlated significantly with the MRC scale, whereas the same did not occur when it was correlated with the 20-cm visual analogue scale in patients with COPD.[25] Another study investigated the correlation between the MRC scale and the sensation of dyspnea measured using the Borg scale during the 6MWT and the maximum cardiopulmonary test on cycle ergometer in the same population.[26] That study showed that the MRC scale scores correlated more strongly with dyspnea during the 6MWT than with dyspnea during the maximum cardiopulmonary test. In addition, it correlated negatively with the distance covered on the 6MWT, suggesting that the scale has a relationship with functional capacity in patients with COPD. In the present study, the MRC scale tended to correlate with the 6MWT, which confirms the link between ADL limitations and reduced functional exercise tolerance, since recent studies have shown that the 6MWT is the functional test that possibly better reflects the degree of daily physical activity of patients with COPD.[4,27]

In the present study, ADL limitation did not correlate with the degree of airway obstruction. Previous studies on this subject have produced conflicting results,[4,10,27-30] possibly due to differences in the degree of airway obstruction of the groups of patients included in each study and in the instruments used to assess ADL limitation, varying greatly in terms of the questionnaires applied and the physical activity monitoring.

The Portuguese-language versions of the PFSDQ-M and of the MRC scale have yet to be tested in terms of their sensitivity to changes observed after a pulmonary rehabilitation program. Although the size of the sample might be seen as a limitation, the present study had a sample size similar to that of the validation studies of the PFSDQ-M in the Swedish language (n = 30)[20] and of the validation of the SGRQ in the Portuguese language (n = 30).[13,15] In addition, the highly significant statistical results clearly show that it was possible to assess reproducibility and validity of the scale with the sample used.

Based on our findings, Portuguese-speaking researchers and clinicians will be able to use two new, valid and useful tools in order to obtain reliable data on the ADL and dyspnea profiles of patients with COPD in their everyday lives. In addition, patients will benefit from treatment that is more efficacious and will specifically focus on their difficulties in relation to ADL limitations.

In summary, the Portuguese-language versions of the PFSDQ-M and of the MRC scale proved reproducible and valid for use in patients with COPD. Therefore, the present study provides two new and important tools to assess limitation in ADL performance and limitation imposed by dyspnea on that population.

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**Appendix 1 -** Portuguese-language version of the Pulmonary Functional Status and Dyspnea Questionnaire - Modified version.

## Dyspnea assessment

**Instructions:** the following questions are related to your **respiratory distress.** Please, choose the most accurate answer.

1. Have you ever had shortness of breath? Yes ( ) No ( )

2. How many times a month do you have severe to extreme shortness of breath? _____

Using the scale below, put a mark on the line between 0 (no shortness of breath) and 10 (extreme shortness of breath) in response to the following questions:

3. Indicate how you felt on **most days** during last year:

| Shortness of breath | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

4. Indicate how you feel **today:**

| Shortness of breath | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

5. Indicate how you feel during most everyday activities:

| Shortness of breath | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## Assessment of dyspnea

**Instructions:** classify the activities below on a scale of 0 to 10 according to the degree of shortness of breath that each activity usually causes. Example: mark the column below the "0" with an "X" if the activity **does not usually cause shortness of breath**; below the "4", "5" or "6" if it causes **moderately severe** shortness of breath and below the "10" if it causes **extreme** shortness of breath. For activities in which you have never engaged, mark no column.

## Degree of shortness of breath

| | None | Mild | | | Moderate | | | Severe | | | Extreme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1. Brushing hair | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2. Raising arms above the head | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3. Bathing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4. Washing hair | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5. Putting on a shirt | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6. Preparing lunch | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7. Walking up a slope | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8. Climbing up three steps | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9. Walking three meters | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10. Walking on uneven ground | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**Appendix 1 -** Continuation...

## Assessment of fatigue

**Instructions:** the following questions are related to how **tired or exhausted** you feel. Please, choose the most accurate answer.

1. Have you ever felt tired or exhausted? Yes ( ) No ( )

2. How many times a month do you feel severe to extreme fatigue? _____

Using the scale below, put a mark on the line between 0 (no fatigue) and 10 (extreme fatigue) in response to the following questions:

3. Indicate how you felt on most days during last year:

| Fatigue | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

4. Indicate how you feel today:

| Fatigue | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

5. Indicate how you feel during most everyday activities:

| Fatigue | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| None | Mild | | | Moderate | | | Severe | | | Extreme |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## Assessment of fatigue

**Instructions:** classify the activities below on a scale of 0 to 10 according to the degree of fatigue that each activity usually causes you. Example: mark the column below the "0" with an "X" if the activity **does not usually cause fatigue**; below the "4", "5" or "6" if it causes **moderately severe** fatigue and below the "10" if it causes **extreme** fatigue. For activities in which you have never engaged, mark no column.

## Degree of fatigue

| | None | Mild | | | Moderate | | | Severe | | | Extreme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1. Brushing hair | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2. Raising arms above the head | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3. Bathing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4. Washing hair | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5. Putting on a shirt | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6. Preparing lunch | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7. Walking up a slope | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8. Climbing up three steps | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9. Walking three meters | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10. Walking on uneven ground | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**Appendix 1 -** Continuation...

## Assessment of change in activities

**Instructions:** for each activity, put an "X" in the appropriate square indicating your involvement with the activity now, compared to what it was like before you developed respiratory problems. For example, mark the square in the "0" column if the activity **did not change** after you developed respiratory problems; in the "4", "5" or "6" column if you had to **moderately change** the activity and in the "10" column if you **no longer perform this activity**. If you have never engaged in the activity, mark the first column.

## Degree of change

| | Never performed | No change | Slight | | | Moderate | | | Extreme | | | Can no longer perform |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1. Brushing hair | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2. Raising arms above the head | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3. Bathing | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4. Washing hair | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5. Putting on a shirt | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6. Preparing lunch | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7. Walking up a slope | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8. Climbing up three steps | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9. Walking 3 meters | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10. Walking on uneven ground | --- | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**Appendix 2 -** Portuguese-language version of the Medical Research Council scale.

1. Only experiencing shortness of breath during vigorous exercise.
2. Experiencing shortness of breath when walking briskly or ascending a mild slope.
3. Walking slower than other people of the same age due to shortness of breath or having to stop in order to recover normal breathing even when walking slowly.
4. Stopping in order to recover normal breathing after walking less than 100 m or for only a few minutes.
5. Experiencing such severe shortness of breath that it is no longer possible to leave the home, or experiencing shortness of breath when getting dressed.